Activity: **6.9**
Define Programming Standards

Responsibility: Project Team Programmers

Description: Programming standards are necessary to ensure that custom-built software has acceptable design and structural properties. Programming standards must be practical, easy to implement, and accepted by the project team. The project team programmers should be the primary developers of the standard. Use a structured approach to programming to allow for easy modification and to facilitate testing and debugging.

The following guidelines are generally applicable to any programming language. Use these guidelines as the basis for the programming standard and add project-specific standards relating to the programming language and tools.

- Control Flow Constructs
  - sequence
  - if-then-else
  - case statement
  - do-while (pretest loop)
  - do-until (post-test loop)
- Module Size
  - Number of executable lines of source code should average 100 lines per unit.
  - Units should contain no more than 200 lines of executable source code.
- Module Design
  - Units do not share temporary storage locations for variables
  - Units perform a single function
  - Avoid self-modifying code
  - Each unit is uniquely named
  - Each unit has a standard format:
    - prologue
    - variable declarations
    - executable statements/comments
  - Use single entry/exit points except for error paths
  - Set comments off from the source code in a uniform manner

Description, continued:

- Symbolic Parameters
  - Use instead of specific numerics
  - Use for constants, size of data structures, relative position in list
- Naming Conventions
  - Use uniform naming throughout each unit and module to be put under configuration control
  - Use meaningful variable names
  - Do not use keywords as identifiers
- Mixed Mode Operations
  - Avoid mixed mode expressions
  - Add comments in code whenever used
- Error and Diagnostic Messages
  - Design messages to be self-explanatory and uniform
  - Do not require user to perform table lookups
- Style
  - Use conventions such as indentation, white space, and blank lines to enhance readability
  - Align compound statements
  - Avoid "goto" statements.
  - Avoid compound, negative Boolean expressions
  - Avoid nesting constructs beyond five levels deep
  - Avoid deeply nested "if" statements.
  - Use parentheses to avoid ambiguity
  - Include only one executable statement per line
  - Avoid slick programming tricks that may create or encourage defects or be difficult to maintain; the most direct solution is best

Work Product: Create a programming standards document and distribute the document to all project team members. An existing programming standard can be used if it is applicable to the programming language and tools being used for the project.

Review Process: Conduct a peer review to assure that the programming standards are complete and appropriate for the project's programming language and tools.